Using Bioenhancers and Mobile App, AgriShield, To Improve Pest Management: A Novel, Cost-Effective, Environmentally Friendly Strategy To Increase Crop Yield

Goyal, Nina (School: Martin County High School)

Fall armyworms damage over 80 host plants, especially maize, and cause annual crop losses of around $9.4 billion. With the global population projected to reach 9 billion people by 2050, the demand for food will increase. Currently crops are produced under the protection of chemical pesticides and insecticides, however these have led to resistance, environmental and health issues, highlighting the need for new solutions. In this study, a biopesticide was designed, and bioenhancers were used to improve RNA interference delivery to fall armyworms. Pupae color, pupae weight, deformities, and mortality were measured, and statistical analyses (One-Way ANOVA including Tukey HSD for mortality, deformities, and weight; Mann-Whitney U Test for color) showed significant results ($p<0.05$) between control and treated groups. Quantitative PCR (qPCR) quantified target suppression. Studies indicate that bioenhancers can improve absorption by up to 200%. When applied to agriculture, RNAi's ability to target various pests at different knockout rates combined with these bioenhancers offers cost savings on dsRNA, while boosting crop yields and profits. A mobile app, called AgriShield was developed to help farmers map fields, track pest levels, manage biopesticide use and costs, and predict future fall armyworm populations. This novel research demonstrates that bioenhancers enhance the efficacy of RNAi in pest control, providing a highly specific, environmentally friendly, and economically viable alternative to traditional pesticides. RNAi technology with bioenhancers as well as the use of AgriShield represents a breakthrough in agriculture, offering a promising approach to managing pests or weeds and increasing crop yield.

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